Topics in Primary Care Medicine

Benign Prostatic Hyperplasia

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"Topics in Primary Care Medicine" presents articles on common diagnostic or therapeutic problems encountered in primary care practice. Physicians interested in contributing to the series are encouraged to contact the series' editors.

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Benign prostatic hyperplasia (BPH) is a nearly ubiquitous condition in elderly men. Symptoms attributable to BPH are increasingly common after the fifth decade and account for a significant percent of the urologic complaints confronting primary care physicians. It is essential that primary care physicians be familiar with the principles of evaluation and management of this important problem.

Anatomy and Physiology

The prostate is a pyramidal-shaped fibromuscular and glandular accessory sex organ that lies retroperitoneally encircling the bladder neck. It is composed of two distinct types of glandular elements—the inner periurethral glands, which are responsible for the hyperplasia of BPH, and the external glands, which are the site of neoplastic degeneration. The secretions (seminal plasma) of the prostate and other sex accessory glands (epididymis, vas deferens and seminal vesicles) constitute most of the volume and chemical components of the ejaculate. This fluid has a high concentration of zinc, potassium, citric acid, fructose and prostaglandins and contains a variety of proteins including proteolytic enzymes and immunoglobulins. These substances are thought to provide optimal conditions for sperm motility and survival in the male and female reproductive tracts, and probably also play a role in protecting the male genitourinary tract from infection.

Incidence

Autopsy studies of men older than 40 years have found an incidence of BPH of 80%. By the eighth decade, 90% of men will have BPH and it is estimated that 10% of men who live to age 80 will require an operation for BPH. No association of BPH has been found with social class, marital state, celibacy, sexual drive or blood groups. However, symptoms develop in men with European heritage more often than in men with Asian heritage. Associations with coronary artery disease, hypertension, diabetes mellitus and cirrhosis are postulated but no common etiologic factors have been identified. Whether or not men with BPH are at increased risk for cancer of the prostate has not been determined.

Pathophysiology of BPH

Periurethral glandular hyperplasia begins after 40. As the volume of tissue in the periurethral gland increases, the external glands and the urethra become compressed. Abundant growth of the periurethral gland can occasionally result in urethral obstruction even without detectable enlargement on a rectal examination. The pathogenesis of BPH has been extensively studied and recently reviewed. Current theory holds that BPH results from an age-related increase in the serum ratio of estrogens to androgens and a concomitant increase in the dihydrotestosterone content of the gland. These hormonal changes are thought to act synergistically in susceptible glands to cause hyperplasia. The importance of testosterone and its derivatives in the pathogenesis of BPH is supported by a total absence of BPH in eunuchs and regression of BPH following castration.

Enlargement of the prostate without obstruction causes no obvious physiologic derangements. The major consequences of BPH result from the pressure effects of urethral obstruction on the bladder, ureter and kidneys. The initial response of the bladder to outlet obstruction is detrusor muscle hypertrophy. This hypertrophy generally remains clinically silent because the increased bladder contractility is able to overcome the outflow resistance. Progressive outlet obstruction results in further increases in intravesicular pressure with herniation of bladder mucosa between the trabeculated muscle bands producing sacculations and eventually diverticula. Unchecked, this process eventually leads to in-

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ABBREVIATIONS USED IN TEXT

BPH = benign prostatic hyperplasia
IVP = intravenous pyelogram

complete bladder emptying, progressive dilation, interference with ureteral emptying and disturbance of the ureterovesical valve mechanism. Dilation of the ureter and renal pelvis follows and can result in progressive renal insufficiency, tubular concentrating defects, hypertension and hyperkalemic distal renal tubular acidosis.

Clinical Features

Disturbances of micturition are the predominant presenting symptoms of patients with symptomatic BPH. A patient may complain of diminution in the caliber and force of the urinary stream, hesitancy in initiating voiding (especially on arising in the morning), a feeling of incomplete emptying of the bladder, frequency or nocturia. Because residual bladder urine and bladder diverticula predispose to cystitis and recurrent urinary tract infections, symptoms of lower or upper urinary tract infection may predominate. With bladder decompensation, symptoms of overflow incontinence occur. The dilated veins on the surface of the enlarged prostate are subject to rupture with resultant gross or microscopic hematuria.

On occasion, BPH remains clinically silent until nonurologic symptoms bring the patient to medical attention. Patients may present with gastrointestinal symptoms due to massively distended bladders or hydronephrotic kidneys. Alternatively, weight loss, weakness, mental confusion, cardiac decompensation or anemia from advancing renal failure may develop even in the absence of severe disturbances in micturition. This mode of presentation for BPH has been referred to as "silent prostatism." Finally, patients may present with acute urinary retention. Such episodes may be precipitated by enforced bed rest, vigorous use of diuretics, an alcohol binge or the injudicious prescription of anticholinergics, major tranquilizers, tricyclic antidepressants or decongestants. Aminophylline (theophylline and ethylenediamine), the antiarrhythmic disopyramide phosphate and cimetidine are recent important additions to the list of drugs capable of precipitating acute urinary retention.

Differential Diagnosis

The type of diseases that should be considered in the differential diagnosis of BPH, of course, depends on a patient's presenting complaints. Purely obstructive symptoms (decreased force of stream, hesitancy) may be seen with urethral stricture and prostatic carcinoma. Irritative symptoms (urgency, burning, penile pain) often coexist with obstructive symptoms and occur with acute and chronic prostatitis, cystitis and bladder cancer. Neurogenic bladder dysfunction can result in incontinence and urgency (spastic bladder) or incontinence and urinary retention (flaccid bladder). Hematuria should raise the suspicion of both lower and upper tract cancer.

Diagnostic Evaluation

Evaluation of any of the above complaints should include initial observation of a patient's voiding to substantiate any pronounced decrease in the size or force of the urinary stream. This should be followed by an examination of the lower abdomen and flanks for evidence of enlarged kidneys or bladder distention and a careful rectal examination. Using a well-lubricated gloved index finger with the patient in the knee-chest position or leaning forward over an examining table, the prostate should be carefully examined. A normal adult prostate is chestnut-sized, firm and elastic with the consistency of a rubber ball. Its lateral margins should be distinct, and a shallow, median furrow is usually palpable. Hyperplasia usually produces a smooth, firm elastic enlargement of the prostate. Stoney hard, asymmetric or nodular prostates are more likely to harbor cancer. A digital rectal examination has been shown to be as sensitive and specific as the more costly noninvasive techniques for detecting clinically apparent cancer in a hypertrophic prostate gland. A point that deserves emphasis is the inconsistent relationship between prostatic size and degree of obstruction. Normal-sized glands can cause severe obstruction when periurethral hyperplasia predominates, whereas huge glands do not invariably cause obstruction. Straight catheterization after voiding can also be done to assess bladder function. A post-voiding residual of greater than 50 to 100 ml of urine is abnormal and suggests significant obstruction or bladder decompensation (or both). Analysis of urine should be done to assess concomitant infection, presence of hematuria and the renal concentrating ability. Blood urea nitrogen and serum creatinine levels should be measured to evaluate renal function. An intravenous pyelogram (IVP) was once considered a routine part of the workup of patients with possible BPH. This practice has recently come under critical review and it now seems more reasonable to do an IVP only in those patients whose history or results of a physical examination or laboratory tests indicate the possibility of significant associated urinary tract abnormalities. For example, an IVP should be done if hematuria or disproportionate renal insufficiency is present. Renal ultrasonography can be done when radiographic contrast materials are contraindicated. If there is a suggestion of neurogenic bladder dysfunction, a cystometrogram is mandatory. Cystoscopy should be carried out on all patients who require prostatectomy and is best done immediately before the surgical procedure.

Management

Management options should be influenced by both the subjective severity of symptoms and the objective assessment of severity of obstruction. Many patients with mild symptoms and minimal evidence of significant obstruction can be managed conservatively. Most of these patients will show spontaneous fluctuations of symptoms for years with stable renal function, and a period of observation is justified in this group. Taking an extra minute or two to fully empty the bladder may provide symptomatic relief for some patients. Avoiding diuretics before bedtime, including alcohol and caffeine, may diminish nocturia and prevent nocturnal bladder distention. Drugs that interfere with bladder contractility should be used judiciously. The use of hormonal therapy (progestins and antiandrogens) for treating symptomatic BPH is still under investigation. α-Blocking drugs such as phenoxybenzamine hydrochloride and prazosin hydrochloride may also afford symptomatic relief by de-

creasing α-adrenergic-mediated increases in bladder neck and urethral muscle tone. Postural hypotension and dizziness are limiting their more widespread use, however.

Surgical intervention is clearly indicated for those patients whose severe obstruction has led to evidence of deterioration of bladder function (large postvoiding residuals, recurrent infections or acute retention) or renal function (rising urea nitrogen and creatinine levels, evidence of hydronephrosis or distal renal tubular acidosis). The few patients who are disabled by their symptoms but are without evidence of severe obstruction need careful evaluation by a urologist to determine if a surgical procedure might relieve their symptoms. Urine flow measurements may be useful in assessing the presence of significant obstruction in these patients. The choice of the surgical procedure will depend on the size of the prostate, the need to treat accompanying problems such as bladder diverticula and the experience of the surgeon. Transurethral resection of the prostate is the most common surgical approach and most patients can be effectively treated by this method. Suprapubic or retropubic approaches are used when a prostate is large. The overall mortality for simple prostatectomy is less than 1%. In patients with poor general health, advanced cardiopulmonary disease or uremia (or a combination of these), the operative mortality increases to about 5%. Morbidity is seen in about 15% to 20% of cases and includes bleeding, infection, incontinence, stricture, retrograde ejaculation and impotence. Those few patients who are deemed inoperable or who refuse an operation can be managed with intermittent or ongoing Foley catheter drainage.

The vast majority of carefully selected surgical patients will have complete relief of symptoms postoperatively. Persistence of symptoms usually implies the presence of concomitant problems that escaped detection preoperatively. Recurrence of BPH occurs about 5% of the time in the first ten years following transurethral resection of the prostate. The continuing risk of prostatic carcinoma in residual prostatic tissue should be kept in mind.

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